of species than had previously found favour in this country. Taking Koch and Fries as his models, from whom he largely borrowed, he published the first edition of his "Manual" in 1843. This new departure caused considerable commotion and opposition from the older school of botanists; and the fact that Babington did not possess the critical acumen and originality of the masters in his adopted school, sometimes exposed him to attacks. Nevertheless the "Manual" was a success, passing through eight editions, the last of which appeared in 1881; and it still enjoys great favour, even among those who do not go so far in the matter of species. Babington was also author of several local floras; the first being the "Flora Bathoniensis," 1834; followed by the "Flora Sarniensis," 1839, and a "Flora of Cambridge," in 1860.

Daniel Cady Eaton, who belonged to a school of American botanists, of whom very few survive now, was the grandson of Amos Eaton, the author of the formerly famous "Manual of the Botany of North America," which passed through many editions; and son of General Amos E. Eaton, also a devotee of natural history. D. C. Eaton was born in 1834, and early evinced a liking for botany. After a successful career at school and college, he experienced many changes, including service in the federal army during the civil war. In 1867 he was called to the Botanical Chair of Yale College, New Haven, which he held until his death. As an author he will be best remembered by his writings on North American, Mexican, and West Indian ferns. His principal, or at least most popular, work is his "Ferns of North America," illustrated in colours by J. H. Emerton and C. E. Faxon.

W. B. H.

NOTES.

DR. BERGH, of Copenhagen, has been elected a Correspondant of the Paris Academy of Sciences, in the Section of Anatomy and Zoology.

THE resignation is reported of Mr. R. Trimen, F.R.S., Curator of the South African Museum, Cape Town, and also of Mr. R. L. J. Ellery, C.M.G., F.R.S., Director of the Observatory at Melbourne.

THE deaths are announced of Dr. Adolf Gerstäcker, Professor of Zoology in the University of Greifswald; Dr. Pellegrino Strobel, Director of the Natural History Museum at Parma; Prof. H. Witmeur, Professor of Mineralogy and Geology in the University of Brussels; and Dr. W. Fabritius, Astronomer at the Kieff Observatory from 1876 to 1894.

THE French Association for the Advancement of Science met at Bordeaux last week. It was at Bordeaux that the Association held its first meeting in 1872, and this year the same cordial hospitality was accorded to its members as was given twenty-three years ago. The president of the recent meeting was M. Émile Trélat, and in his presidential address on "La Salubrité," he indicated the place of hygiene among the sciences, and traced its limits.

THE annual congress of the British Institute of Public Health was opened at Hull on Thursday last, under the presidency of the Mayor. On Friday, Sir A. Rollit delivered an address as president of the municipal and parliamentary section of the Institute, and Dr. Cameron delivered an address in the section of preventive medicine. It was resolved on Monday—"That in the interests of public health all municipal and local authorities should be empowered to provide crematoria, and that a petition be presented to Parliament in support of the Bill about to be presented to secure this object." Prof. W. R. Smith brought forward the subject of the influence of schools on diphtheria, and in the course of his remarks contended that schools did not play that important part in the spread of diphtheria which they had been supposed to do. The final sitting of the congress was held on Tuesday, when the reports of the several sections were adopted, and a resolution was passed that every house in a watering-place where lodgers were accommodated should undergo a survey by the sanitary authority, and that a certificate of fitness should be compulsory.

THE annual summer meeting of the Institution of Junior Engineers, the headquarters of which are in London, takes place from August 17 to 24, the rendezvous being Belgium. The towns to be visited include Antwerp, where the municipal docks, M. Kryn's diamond-cutting works, and other places of interest will be opened to members' inspection. At Ghent, MM. Carel's engine works, M. de Hemptinne's cotton-spinning works, and M. Van Houtte's nursery gardens will be seen; at Brussels, the electric lighting station; whilst at Liège, the works of the Société Cockerill, the Vielle Montagne zinc works, the St. Leonard locomotive works, the Val St. Lambert glass works, the Small Arms Factory, and the Electric Tramway Installation will be visited. In honour of the Institution a banquet is to be given by the Liège section of the Society of Engineers from the University, and the members will also be the guests of the Société Cockerill. An excursion to Verviers, where the Chamber of Commerce will entertain the visitors, is arranged for the purpose of seeing works in connection with the woollen cloth industry. Here MM. Peltzer's works and those of M. Duesberg-Delrez, La Vesdre, and M. Hauzeur Gerard fils, will be opened. The celebrated Gileppe reservoir, from which Verviers receives its domestic and manufacturing supply, is also included in the programme. A large number of members have notified their intention of being present at the meeting, which promises to be one of the most successful the Institution has held.

AN auto-mobile carriage race between Chicago and Milwaukee, promoted by the *Times-Herald* of Chicago, will be decided on Saturday, November 2, the object being to encourage and stimulate the invention, development, perfection, and general adoption of motor carriages. The amount offered in prizes is 5000 dollars, apportioned as follows:—First prize, 2000 dollars and a gold medal, open to competition to the world; second prize, 1500 dollars, with a stipulation that, in the event the first prize is awarded to a vehicle of foreign invention or manufacture, this prize shall go to the most successful American competitor; third prize, 1000 dollars; fourth prize, 500 dollars. The third and fourth prizes are open to all competitors, foreign and American. The rules laid down stipulate, among other things, that no vehicle shall be admitted to competition which depends in any way upon muscular exertion, except for purposes of guidance. Competing vehicles which derive their power from petroleum, gasoline, electricity, or steam, and which are provided with receptacles for storing or holding the same, will be permitted to replenish the same at Waukegan, Ill., and at Kenosha, Wis., but at no other points.

DURING the past week the weather over the United Kingdom has been very unsettled, owing to the advance of various low-pressure areas from the Atlantic. Several heavy thunderstorms have occurred, the most severe being on Saturday night, the 10th inst., over the southern and south eastern parts of England. In London the storm was very violent, and the lightning was of unusual brilliancy. The disturbance travelled from south to north, and was accompanied by heavy rain. An exceptionally heavy thunderstorm also occurred at Holyhead on the same night, and the rain measured there on the next morning amounted to 2·68 inches. The *Weekly Weather Report* of the 10th inst. states that the rainfall for the week exceeded the average in all districts, the amount over England being about twice as much as the mean.

THE Meteorological Office has received through the Colonial Office a report from the Governor of Hongkong, according to which it appears that the colony was recently suffering from a great drought; the rainfall from January 1 to June 23 last having been only 13·7 inches, being a deficit of no less than 28·7 inches on the mean of the corresponding period of the previous five years. The Governor draws attention to the fact that between October 1893 and April 1894, the colony suffered much from want of rain, and that the plague of the latter year was supposed to have originated from a deficient water supply. Though the drought of the first half of this year has been far more serious than that of 1893–94, the plague has not yet reappeared in an epidemic form; but the reservoirs had, at the date of the despatch (June 26), only about a week's supply left in them. From a return furnished by the Director of the Hongkong Observatory, it appears that the greatest deficiency has occurred during May and June, when it amounted to 11 and 12½ inches respectively.

La Technologie Sanitaire is the title of a new journal devoted to questions of water supply and applied hygiene. It is published in Louvain, and is edited by a civil engineer, Victor J. Van Lint. The first number, amongst other contributions, contains an interesting and useful article by M. Ad. Kemna, the well-known Director of the Antwerp Waterworks, on "The Theory of Sand Filtration." The practical genius of the English in the past is emphasised in commenting upon Simpson's introduction of sand filters in London in the year 1839, and we are told that having produced such brilliant results, it is not surprising that as a nation we are so slow and reluctant to adopt more modern methods and change our system of technical instruction! Besides original articles, reviews of books are also appended, and what, perhaps, is one of the most useful features of this undertaking, is the bi-monthly issue of a supplement, international in character, containing a bibliography of books, pamphlets, &c., published on subjects connected with water supply, together with short notices of public hygienic enterprise in different parts of the world.

INFRA-RED light is invisible to us either because the humours composing the eye are opaque to it, or because the light is incapable of exciting the retina. Cima and Janssen have adopted the former explanation, but the alternative one has been accepted by Tyndall, Engelmann, and others, while Helmholtz maintained that the strong absorption suffered by infra-red rays in their passage through the eye is sufficient to account for their invisibility. That they are strongly absorbed has been found by all observers, but Herr E. Aschkinass proves, in the last number of *Wiedemann's Annalen*, that there is no sudden increase of absorption beyond the red end of the spectrum, and that the absorptive powers of the various media of the eye are practically the same as that of water. The apparatus used for this investigation contained a fluor-spar prism and a bolometer. Thin layers of the humours of an ox eye and a human eye were interposed in the path of the rays from a zircon burner, and the absorptive effects noted by means of the bolometer. It was found that at a wave-length of 0·81 μ, the limit of the visible spectrum, the absorption was 5 per cent. for the whole human eye. This increased to 10·5 per cent. at 0·872, reached 60 per cent at 0·98, decreased to 34·5 per cent. at 1·095, and finally reached 100 per cent., or total absorption, at 1·4 μ. This shows that a large proportion of infra-red light does reach the retina through the eye, but is not capable of affecting the nerves and producing visual sensation.

THE last number of the *Wissenschaftliche Beihefte zum Deutschen Kolonialblatte* (Bd. viii. Ht. 2) is a further illustration of the care with which the German Colonial Society is organising the scientific investigation of German Africa. The present number contains the calculations by Dr. Fritz Cohen, Dr. L. Ambronn, and Dr. W. Brix, of the astronomical observations made by Dr. Grüner in Togo-land, and by Ramsay and Stuhlmann in German East Africa. There are also valuable tables of meteorological observations, made in German South-West Africa, and in Kondeland, and from the Marshall Islands; from the last locality comes an especially useful table showing the diurnal variation in atmospheric pressure, and giving the mean reading for every hour for each month in the year. Preuss contributesa report on the geography of the Smaller Cameroons, and Steinberg one on the diseases of the natives of the Marshall Islands. There is also a detailed study, by Dr. O. Warburg, of a beetle (*Herpetophygas fasciatus*) parasitic on the coffee trees in German East Africa. A good plate shows the insect in its various stages, and also illustrates its ravages on the trees.

HERR OSCAR NEUMANN has published a preliminary account of his recent important expedition across Masai-land to Uganda in the last number of the *Verhandlungen der Gesellschaft für Erdkunde zu Berlin* (Bd. xxii. No 4–5). Herr Neumann went out to East Africa in November, 1892, and after spending some months in preparation there, left for the interior on April 27, 1893. The caravan, consisting of 135 men, started from Tanga, and passing the southern border of the Usambara country, crossed Nguru to Irangi. Here a series of accidents, exhaustion of supplies, and some severe fighting with the natives, during which Herr Neumann was wounded in the mouth by an arrow, compelled the expedition to retreat southward to Mpwapwa. After resting there the party went northward across Irangi to the Gurui Mountain. This was ascended, though with considerable difficulty. Upon the higher slopes an interesting series of Alpine plants were found, including Azalea and Rhododendron. No trace of a crater remains near the summit, but some small craters occur in an adjoining valley. From Gurui the expedition followed up the East African Rift Valley, along Baumann's route past the salt lakes of Manyara and Natron. He examined the volcanoes Doenyo Kavinjiro and D. Ngai; on the latter he found a steam vent below the summit. From this point he followed Fischer's track past Nguruman to the south-west of the volcano of Suswa. Thence he turned westward to the shore of the Victoria Nyanza in Kavirondo, where the expedition again had great difficulties with the natives. Marching round the Nyanza through Usoga, he reached Uganda, but the excessive caution of an English officer prevented his reaching Mt. Elgon. From Uganda, which he describes as unhealthy and poorer than Usoga, he returned along the English road, across Mau, and past Naivasha and Machakos to Kibwezi, whence he diverged to Taveta, and Kilima Njaro, and thus back to the coast at Mombasa, where he arrived on February 5, 1895. The zoological collections made are very extensive, including 600 species of birds, 90 species of reptiles and amphibia, 50 species of mollusca, and about 1000 species of insects, and 90 species of mammals, of which five have been described as new by Matschie.

DR. OTTO KUNTZE has recently issued, under the title of "Geogenetische Beiträge" (Leipzig, 1895, 78 pp.), a series of papers dealing with various geological problems, on which his journeys have thrown light. The first paper gives the evidence for some oscillations of level in the Andes, based on the inclination of some beds of iron-stained sands and laterite, and on the distribution of plants. He states the evidence with care, as it shows that the alterations of level have occurred quietly and without any sudden catastrophic changes. A second paper discusses the evidence on which it is claimed that there was a glaciation in Carboniferous times. The phenomena, often regarded as a proof of this, is attributed by Dr. Kuntze to wind erosion. He gives a figure showing perched blocks and rounded rock surfaces in the Sierra de Tandil in the Argentine Republic, which have thus been formed. The third article in the series discusses the organic and chemical theories of the origin of the Chilian deposits of saltpetre. The next subject considered is the method of the silicification of fossil wood: the author readvances his old theory, and replies to the criticisms made by Rothpletz and Solms-Laubach upon it, and advances nine arguments against Solms-Laubach's rival theory. The fifth paper describes cases in which deposits of salt have been formed under continental instead of marine conditions, which the author explains as due to the decomposition of minerals containing chlorine in rocks destroyed by subaerial denudation. The last and longest paper in the collection, rediscusses the old problem of the formation of coal. He considers the three alternative theories as to whether coal is allochthon, *i.e.* formed from vegetable material deposited elsewhere than on its place of origin; or is autochthon, or formed by the decay of plants *in situ;* or is pelagochthon, *i.e.* formed under the sea. The author advocates the last. He gets over the difficulty of Stigmaria, by declaring that his fellow botanists are wrong, and that its supposed rootlets are really floating leaves. He says that the figures, given in the text-books, are all copied from one source, and declares that there are no specimens in the museums of "Dresden, Vienna, London, Paris, Berlin, &c.," which give any support to the rootlet theory. He gives an ideal view of a landscape in the Carboniferous period, showing the Stigmaria spreading over the floor of a sheet of water, with the "rootlets" rising as aquatic leaves.

MR. JAMES R. GREGORY, the mineralogist and dealer, wishes it to be known that he has removed from 88 Charlotte Street, Fitzroy Square, to more convenient premises at 1 Kelso Place, Kensington, W.

MESSRS. CHAPMAN AND HALL have been constituted sole agents in this country, the continent, and the colonies, for the sale of the important scientific and technological publications of Messrs. Wiley and Sons, of New York.

THE August *Journal* of the Anthropological Institute contains papers on Prehistoric remains in Cornwall; the northern settlements of the West Saxons; changes in the proportions of the human body during the period of growth; the languages spoken in Madagascar; and on a collection of crania of Esquimaux. There is also a description, by Mr. M. V. Portman, of the methods that should be employed by anthropological photographers.

WE have received a copy of a "Report on Slavery and the Slave Trade in Zanzibar, Pemba, and the Mainland of the British Protectorates of East Africa," by the Special Commissioner of the British and Foreign Anti-Slavery Society. The Commissioner spent pretty nearly six weeks in East Africa in studying the subject. Probably the most valuable and trustworthy conclusion in this report, though perhaps not the one to which its author attaches most importance, is that "the whole question of slavery in Zanzibar and Pemba is a very complicated question."

THE volume of *Transactions and Proceedings* of the New Zealand Institute for the year 1894, has reached us. A few of the papers have already been noted in these columns, and as more than seventy papers are included in the volume now published, it is only possible for us to refer to a few of them. A synoptical list of Coccidæ, reported from Australia and the Pacific Islands up to the end of last year, is given by Mr. W. M. Maskell. Sir W. L. Buller, K.C.M.G., F.R.S., has several ornithological papers in the volume, and Captain F. W. Hutton, F.R.S., adds to the knowledge of the axial skeleton in the Dinornithidæ, and there are a number of other papers referring to the same birds. Prof. Arthur Dendy describes some land planarians, bringing the total number of species found in New Zealand up to twenty. The editor of the volume, Sir James Hector, K.C.M.G., F.R.S., contributes several papers to it, and the Rev. W. Colenso, F.R.S., with others, make contributions to the knowledge of the botany of New Zealand.

AMONG the new editions lately received is a translation of Prof. Oscar Hertwig's book "Die Zelle und Die Gewebe," published by Messrs. Swan Sonnenschein and Co. The work has been translated by M. Campbell, and edited by Dr. H. Johnstone Campbell. As we reviewed the original edition in 1893 (vol. xlvii. p. 314), it is only necessary to express satisfaction that such an important treatise on the functions and structure of cells has been brought within the reach of students who do not read German easily. Under this translation from the German, we find on our table two translations into German of papers by British men of science. The papers are published by W. Engelmann in Ostwald's *Klassiker der Exakten Wissenschaften.* No. 61 of this series contains George Green's essay on the mathematical analysis of the theories of electricity and magnetism, edited by Dr. A. J. von Oettingen and Prof. A. Wangerin, and No. 62 is a translation of papers on the physiology of plants, published by Thomas Andrew Knight between 1803 and 1812. This is edited by Prof. H. Ambronn. A third volume (No. 60), just received in the same series, contains papers by Jacob Steiner on geometrical construction, and is edited by Dr. Oettingen. In the Aide-mémoire Series, published by Gauthier-Villars, we have received two books on ballistic subjects, viz. "Balistique Extérieure," by M. E. Vallier, and "Bouches a Feu," by Lieut.-Colonel E. Hennebert. We have also before us "An Elementary Text-book of Mechanics," by Mr. W. Briggs, and Mr. G. H. Bryan, F.R.S., published in the Tutorial Series of the University Correspondence College. The volume is concisely and clearly written, and may be recommended as a useful text-book.

THE additions to the Zoological Society's Gardens during the past week include a Rhesus Monkey (*Macacus rhesus,* ♀) from India, presented by Mr. R. Norton Stevens; a Yellow Baboon (*Cynocephalus babouin,* ♀) from Parrapatti, Eastern Coast of Africa, presented by Mr. J. V. Williams; a Kinkajou (*Cercoleptes caudivolvulus,* ♀) from Demerara, presented by Mr. Sydney Matthews; three Alligators (*Alligator mississippiensis*) from Florida, presented by Mr. Ernest H. Shackleton; two Green Turtles (*Chelone viridis*) from Ascension, presented by Commander Duncan Campbell; a Common Viper (*Vipera berus*), British, presented by Mr. A. Old; a Macaque Monkey (*Macacus cynomolgus*) from Java, a Lion (*Felis leo,* ♀) from India, a Sooty Phalanger (*Phalangista fuliginosa,* var.) from Tasmania, a Larger Hill Mynah (*Gracula intermedia*) from Northern India, a Greater Sulphur-crested Cockatoo (*Cacatua galerita*) from Australia, a Derbian Sternothere (*Sternothærus derbianus*) from West Africa, three South American Rat Snakes (*Spilotes variabilis*) from South America, deposited; a Blossom-headed Parrakeet (*Palæornis cyanocephalus*) from India, a Tuberculated Iguana (*Iguana tuberculata*) from the West Indies, purchased; three Pumas (*Felis concolor*), eight Black Salamanders (*Salamandra atra*), born in the Gardens, two Triangular-spotted Pigeons (*Columba guinea*), two Crested Pigeons (*Ocyphaps lophotes*), bred in the Gardens.

OUR ASTRONOMICAL COLUMN.

THE ROTATION OF VENUS.—Since our note last week on this subject, Signor G. Schiaparelli has published in the *Astronomische Nachrichten* (No. 3304) two letters concerning markings observed on the planet in July, and their bearing upon the question of rotation. The planet was observed from July 3 to 8 under all kinds of conditions, and the conclusion arrived at was that "the aspect of the dusky markings distributed over the disc did not undergo any important modification in form or situation during this period. Save a few small exceptions, all the variations